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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/550,678

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EXAMINER

WONG, EDNA

ART UNIT

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1795

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/550,678	Applicant(s) VAN DER PLAS ET AL.	
	Examiner EDNA WONG	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: ____. |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :September 26, 2005; January 20, 2006; March 10, 2006; January 10, 2008; and July 2, 2008.

Specification

The disclosure is objected to because of the following informalities:

pages 1-13, -- A Brief Description of the Drawings -- is missing.

page 8, line 11, the word "sulfer" should be amended to the word -- sulfur --.

Appropriate correction is required.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

I. Claims **1-14** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1

lines 1-2, "the electrolysis of Al_2S_3 " lacks antecedent basis.

Claim 6

line 2, "the effective area" lacks antecedent basis.

line 3, "the amount and/or size of gas bubbles" lacks antecedent basis.

Claim 8

line 2, "the bath of molten metal" lacks antecedent basis.

II. Claims **1-14** are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the electrolysis of Al_2S_3 .

Claim 1

lines 2-6, recites "using a bath of molten chloride salt in which Al_2S_3 is dissolved, wherein the bath is substantially free from MgCl_2 , and wherein an additive comprising a fluoride compound is added to the bath to improve the electrical conductivity of the bath to enable an increase in the current density in the bath."

Using a bath of molten chloride salt in which Al_2S_3 is dissolved is not a positive step of electrolysis of the Al_2S_3 . It is well settled that unpatented claims are given the broadest, most reasonable interpretation and that limitations are not read into the claims without a proper claim basis therefor. *In re Prater* 415 F. 2d 1393, 162 USPQ 541 (CCPA 1969); *In re Zeltz* 893 F. 2d 319, 13 USPQ 1320.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **1-5, 7-9 and 14** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **Khazanov et al.**

("Electrolysis of Fused Aluminum Sulfide", *Legkie Metally* (1935), Vol. 4, No. 11, pp. 1-14).

Khazanov teaches a process for the production of primary aluminum by the electrolysis of Al_2S_3 :

using a bath of molten chloride salt in which Al_2S_3 is dissolved, wherein the bath is substantially free from MgCl_2 , and wherein an additive comprising a fluoride compound is added to the bath (= Al_2S_3 was electrolyzed in a fused mixture of 70% NaCl and 30% Na_3AlF_6) [abstract].

The additive consists essentially of the fluoride compound (= 30% Na_3AlF_6) [abstract].

The additive mainly consists of the fluoride compound (= 30% Na_3AlF_6) [abstract].

The fluoride compound is cryolite (= 30% Na_3AlF_6) [abstract].

The concentration of the cryolite is in the range of 5 to 30 wt% (= 30% Na_3AlF_6) [abstract].

The bath of molten chloride salt mainly comprises alkali metal chlorides (= 70% NaCl) [abstract].

The bath of molten metal is substantially free of earth alkaline chlorides (= a fused mixture of 70% NaCl and 30% Na_3AlF_6) [abstract].

The electrolysis is carried out at a bath temperature of between 600°C and 850°C (= at 800°) [abstract].

The electrolysis is carried out at a bath temperature of between 700°C and 800°C (= at 800°) [abstract].

The process of Khazanov differs from the instant invention because Khazanov does not disclose wherein the fluoride compound is added to the bath to improve the electrical conductivity of the bath to enable an increase in the current density in the bath, as recited in claim 1.

The invention as a whole would have been anticipated or obvious to one having ordinary skill in the art at the time the invention was made because:

- (i) Where Applicants claim a process in terms of a function, property or

characteristic and the process of the prior art is the same as that of the claim but the function is not explicitly disclosed by the reference, the Examiner may make a rejection under both 35 USC 102 and 103, expressed as a 102/103 rejection (MPEP §2112(III)).

(ii) Khazanov teaches the same fluoride compound as presently claimed. A compound and all of its properties are inseparable. *In re Papesch*, 315 F.2d 381, 391, 137 USPQ 43, 51 (CCPA 1963) [MPEP § 2141.02(V)].

(iii) The Applicant has a different reason for, or advantage resulting from doing what the prior art relied upon has suggested, it is noted that it is well settled that this is not demonstrative of nonobviousness. *In re Kronig* 190 USPQ 425, 428 (CCPA 1976); *In re Linter* 173 USPQ 560 (CCPA 1972); the prior art motivation or advantage may be different than that of Applicants while still supporting a conclusion of obviousness. *In re Wiseman* 201 USPQ 658 (CCPA 1979); *Ex parte Obiaya* 227 USPQ 58 (Bd. of App. 1985) and MPEP § 2144.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

I. Claim **6** is rejected under 35 U.S.C. 103(a) as being unpatentable over

Khazanov et al. ("Electrolysis of Fused Aluminum Sulfide", *Legkie Metally* (1935), Vol.

4, No. 11, pp. 1-14) as applied to claims 1-5, 7-9 and 14 above, and further in view of **Greenfield** (US Patent No. 2,939,824).

Khazanov is as applied above and incorporated herein.

The process of Khazanov differs from the instant invention because Khazanov does not disclose wherein the effective area of an anode extending into the bath is enhanced by reducing the amount and/or size of gas bubbles covering the anode, as recited in claim 6.

An anode would have been inherently used in the electrolysis of the Al_2S_3 in the fused mixture of 70% NaCl and 30% Na_3AlF_6 disclosed by Khazanov.

Greenfield teaches that:

During the normal operation of fused bath electrolytic cells, the electrolytic action causes the conductive surface of the anode to be surrounded by gas bubbles which smoothly evolve and are removed from the reaction. The phenomenon known as anode effect results in a considerably higher net voltage drop between the electrodes of the electrolytic cell and consequent reduction in cell efficiency, and has been observed in electrolytic cells having fused salt electrolytes containing halides of lead, cadmium, silver, the alkali and alkaline earth metals, magnesium, cerium and aluminum; with complex electrolytes of aluminum fluorides and with commercial fused salt electrolytes. It is theorized that anode effect is caused by the building up of a relatively high resistance ionized gas film or layer on the anode of the cell and that once such a layer has become established, the anode effect tends to perpetuate itself since continued current flow is by arcing through such layer (col. 1, lines 30-47).

It has been found that application of a high voltage across the gas phase established at the anode interface will dissipate this gas phase instantly (col. 3, lines 68-75).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the anode described by Khazanov with wherein the effective area of an anode extending into the bath is enhanced by reducing the

amount and/or size of gas bubbles covering the anode because reducing the amount and/or size of gas bubbles covering the anode would have eliminated the high net voltage drop between the electrodes of the electrolytic cell and consequent reduction in cell efficiency as taught by Greenfield (col. 1, lines 30-47; and col. 3, lines 68-75).

The reason or motivation to modify the reference may often suggest what the inventor has done, but for a different purpose or to solve a different problem. It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by the Applicants. *In re Linter* 458 F.2d 1013, 173 USPQ 560 (CCPA 1972); *In re Dillon* 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990), *cert. denied*, 500 US 904 (1991); and MPEP § 2144.

II. Claim **10** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Khazanov et al.** ("Electrolysis of Fused Aluminum Sulfide", *Legkie Metally* (1935), Vol. 4, No. 11, pp. 1-14) as applied to claims 1-5, 7-9 and 14 above, and further in view of **Rogers, Jr.** (US Patent No. 4,133,727).

Khazanov is as applied above and incorporated herein.

The process of Khazanov differs from the instant invention because Khazanov does not disclose wherein the electrolysis is carried out in a multi-polar electrolysis cell, as recited in claim 10.

Rogers teaches that carrying out molten salt electrolysis in a multi-polar electrolysis cell (col. 3, lines 20-31; and Fig. 1).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the electrolysis described by Khazanov with wherein the electrolysis is carried out in a multi-polar electrolysis cell because using a multi-polar electrolysis cell would have extracted heat from the electrolysis chamber containing a molten salt bath as taught by Rogers (col. 3, lines 20-31; and Fig. 1).

III. Claims **11 and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Khazanov et al.** ("Electrolysis of Fused Aluminum Sulfide", *Legkie Metally* (1935), Vol. 4, No. 11, pp. 1-14) as applied to claims 1-5, 7-9 and 14 above.

Khazanov is as applied above and incorporated herein.

The process of Khazanov differs from the instant invention because Khazanov does not disclose the following:

a. Wherein the concentration of the cryolite is in the range 7 to 15 wt%, as recited in claim 11.

b. Wherein the concentration of the cryolite is about 10 wt%, as recited in claim 12.

Khazanov teaches 30% Na_3AlF_6 (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the concentration of the cryolite described by Khazanov with wherein the concentration of the cryolite is in the range 7 to 15 wt%; and wherein the concentration of the cryolite is about 10 wt% because it has been held that

changes in temperature, concentration or both, is not a patentable modification; however, such changes may impart patentability to a process if the ranges claimed produce new and unexpected results which are different in kind and not merely in degree from results of the prior art, such ranges are termed "critical" ranges and Applicant has the burden of proving such criticality; even though Applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within capabilities of one skilled in the art; more particularly, where general conditions of the claim are disclosed in the prior art, it is not inventive to discover optimum or workable ranges by routine experimentation. *In re Aller*, 220 F2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) and MPEP § 2144.05.

IV. Claim **13** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Khazanov et al.** ("Electrolysis of Fused Aluminum Sulfide", *Legkie Metally* (1935), Vol. 4, No. 11, pp. 1-14) as applied to claims 1-5, 7-9 and 14 above, and further in view of **Minh et al.** (US Patent No. 4,464,234).

Khazanov is as applied above and incorporated herein.

The process of Khazanov differs from the instant invention because Khazanov does not disclose wherein the bath of molten chloride salt mainly comprises KCl and NaCl, as recited in claim 13.

Khazanov teaches 70% NaCl (abstract).

Like Khazanov, Minh teaches the electrolysis of fused aluminum sulfide. Minh

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teaches that the chloride melt contains one or more alkali metal chlorides (col. 3, lines 8-12). Suitable alkali metal chlorides include the chlorides of sodium, potassium, lithium, cesium, and rubidium (col. 3, lines 27-29).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the bath of molten chloride salt described Khazanov with wherein the bath of molten chloride salt mainly comprises KCl and NaCl because using two alkali metal chlorides would have been functionally equivalent to using one alkali metal chloride in a chloride melt as taught by Minh (col. 3, lines 8-12; and col. 3, lines 27-29).

Furthermore, it is *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose. The idea of combining them flows logically from their having been individually taught by the prior art (MPEP § 2144.06).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDNA WONG whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edna Wong/
Primary Examiner
Art Unit 1795

EW
November 11, 2008